ESG WHITE PAPER

Oracle Database Appliance X8 Replaces the Pains of Do-it-yourself Infrastructure with Operational Gains

Plug-and-play Appliance Provides Unique Added Values in Small, Midsize, and Edge Environments

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Introduction and Executive Summary

Some product explanations do not need to be long or complex: *Oracle Database Appliance (ODA) is a complete, simple, optimized, and affordable way to run Oracle Database*. The latest iteration, ODA X8, maintains what was good before and adds Intel's latest processors together with expanded storage and networking capabilities, as well as numerous new added-value capabilities. For a small to midmarket organization, business unit, or edge operation, there really is no easier or better way to run Oracle Database; it is just about as near to a "no decision required" option as there can be in IT. With many similarities to its "datacenter core-focused," more powerful sibling Exadata (an enterprise-grade converged database + infrastructure platform), ODA, with its low price and smaller footprint can be more "edge-focused," especially for larger organizations. It's a high-availability appliance, containing integrated storage, servers, operating system, and monitoring/control all in a single box. While the approach differs slightly, the family similarities are evident and strong. Each is purpose-built to optimally run Oracle Database. For each product, Oracle counts many Fortune 500 customers among its customers, but since ODA is aimed more at smaller operations within any business, it naturally emphasizes operational simplicity and quick deployment, as well as the kind of simple and affordable HA and DR capabilities that are crucial for smaller operations and at the edge. You can, however, think of it as a plug-and-play Database box; if you prefer to construct a different, and perhaps more contemporary, term, you can view it as an "HCDb," a hyperconverged database.

The ODA's small footprint—both physically and in terms of the demands it makes upon IT—should not be interpreted as meaning it has fewer capabilities or delivers less value. It packs the full Oracle Database punch and has complete architectural compatibility with the rest of Oracle Database's platforms, both on-premises and in the cloud. Oracle even offers access to "knobs and dials" to tweak things should you want to, but, much like a modern sports sedan with paddle shifters and various suspension choices, the odds are that the vehicle (system) will provide more than enough oomph—not to mention great efficiency—for the vast majority of drivers (applications) most of the time. For Oracle customers, deploying Exadata at the core of database operations and ODAs at the edge is a pragmatic way to optimize their Oracle environment. Both are engineered with Oracle Database at the source code level and deliver net incremental capabilities that lower costs for the business while enhancing security and performance.

Smaller Database Operations Only Impact Scale…Not Sophistication

The scaling of data impacts organizations of all sizes, but for midmarket organizations (or smaller workloads in departments or at the edge), it can be especially challenging. Tighter budgets and skills gaps can force tradeoffs when it comes to the lifeline of businesses: the database(s). Smaller scale is just that—smaller scale; it categorically need *not* imply or create any lesser need in terms of function, sophistication, integration, and flexibility. Yet sometimes this can be the case, leaving smaller-scale-database users in something of a quandary. Deployments that are smaller-scale or at the edge are no less important than any other IT deployment; indeed, the edge is crucial to many organizations' drives to manage scale while delivering responsiveness as well as new applications and services.

Some users have chosen to cut corners, albeit often going with a DIY hardware approach that can add unwanted complexity and unnecessary risk. Others necessarily (or so they feel) end up conceding on their wants and needs, whether sacrificing being on the latest and greatest technology, or skipping an upgrade for fear of downtime. And, of course, while some feel pressure to turn to the generic public cloud for help, they often lack a clear path to get there, or simply don't want to/are not permitted to go. Meanwhile both CI and HCI offerings certainly offer an opportunity to consolidate and simplify the infrastructure itself; although the integration usually stops at the hypervisor, meaning that users are left on their own to integrate the database and applications. Furthermore, a lack of rich solutions to satisfy all database requirements—not just application management, but cost, scale, HA, reliability, etc.—has also caused users to pause.
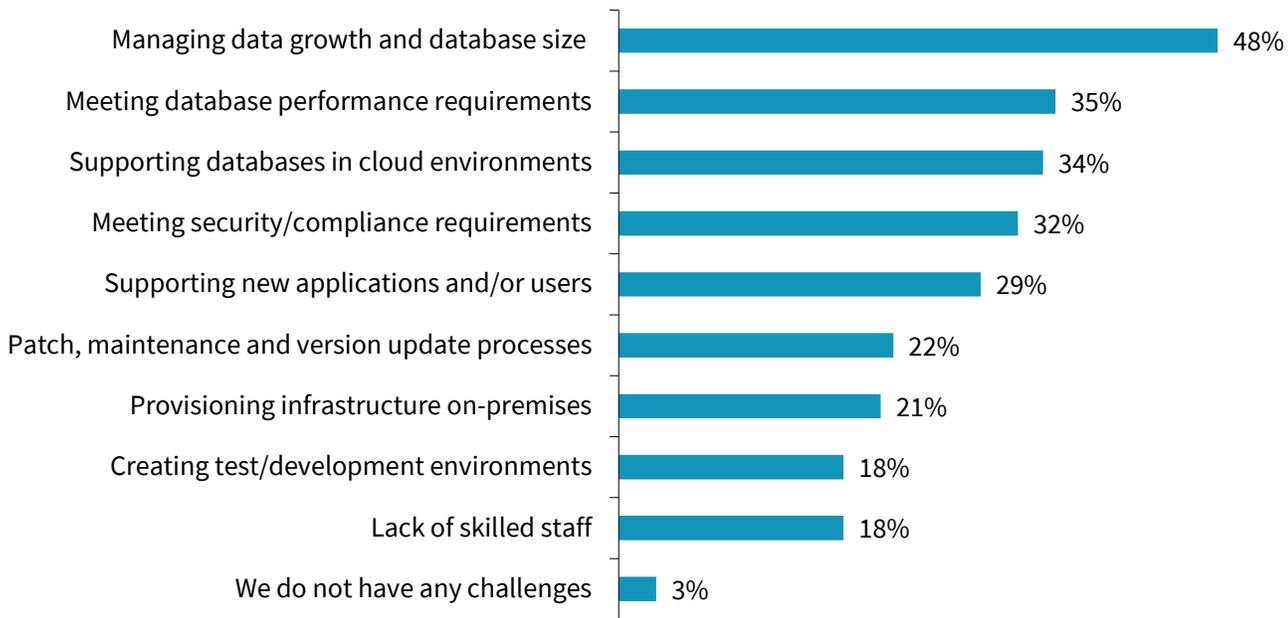
ODA solves the dilemma. It is an Oracle Engineered System; this means it not only removes the issues endemic with other approaches, but also provides additional value—improved performance, security, availability, and cloud-readiness, while reducing risk, time to value, and costs—in holistically running Oracle Database.

The Need for an Integrated—*Engineered System*—Approach

In a nutshell, an Engineered System approach presents a cost- and performance-optimized way to get the most out of an Oracle Database environment. ODA takes an appliance approach to deliver the Engineered System value. In so doing it precludes or mitigates all the main challenges of a DIY approach: everything from involving multiple vendors—and the resulting nightmare of keeping up with patches and upgrades—to the invariably longer deployment times, integration and optimization complications, struggles with sufficient database expertise, and complexity (at best!) when an inevitable cloud integration or move rears its head. The irony is that much of this has everything to do with simply making your database operational (Oracle's *full* integration compares very favorably to alternatives in this regard), yet very little to do with getting value out of it. That brings its own set of issues, as the ESG research[1] in Figure 1 shows.

Figure 1. Database Environment and Infrastructure Challenges

In general, which of the following challenges does your organization have with its current database environment and supporting infrastructure? (Percent of respondents, N=354, three responses accepted)

Challenge	Percent
Managing data growth and database size	48%
Meeting database performance requirements	35%
Supporting databases in cloud environments	34%
Meeting security/compliance requirements	32%
Supporting new applications and/or users	29%
Patch, maintenance and version update processes	22%
Provisioning infrastructure on-premises	21%
Creating test/development environments	18%
Lack of skilled staff	18%
We do not have any challenges	3%

Source: Enterprise Strategy Group

What this research shows is that any appliance to run Oracle Database will be suboptimal if all it does is provide a preloaded and integrated set of hardware and software. While that is no doubt good, since it takes away much of the *pain* of DIY and CI/HCI approaches, it is evidently not as good as it could be by adding *gain* and addressing the key challenges that organizations face in their database environment:

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[1] Source: ESG Survey, *Enterprise Database Trends*, January 2017.

- Data growth impacts all organizations. In fact, nearly half (49%) of organizations expect their database data footprint to grow at least 30% annually.[2]

- Hand-in-hand with scale is performance, which is the second most-cited challenge in the research findings. Keeping pace with database workloads as more users look to access more data is a major challenge.

- Nearly 1 in 3 organizations highlight meeting security/compliance requirements, 22% cite patch, maintenance, and version updating processes, and 21% cite provisioning as challenges.

Oracle Database Appliance X8

READER NOTE: If all you need to know is that ODA is an optimized and packaged way to provision and run an Oracle Database environment for a small to midsize operation or enterprise (centrally or at the edge), then skip ahead to "ODA – Real Added Value and Real Simplicity." If you would like a few more technical details, read this section.

Oracle Database Appliance contains everything needed to deploy a performance-optimized Oracle Database (which is, after all, the essence of an appliance), with integrated processors, storage, networking, *and* the database. In other words, not stopping at the hypervisor level as competitive solutions do. In terms of deployment, it can operate standalone or it can complement Exadata as a distributed node in an edge environment. As with anything Oracle, it offers architectural congruence across its portfolio so users can move platforms without adjusting their applications. If they don't need full movement but perhaps just want to back up to the Oracle Cloud, then that's a relatively simple operation. ODA can save users money versus a DIY approach—Oracle cites customer research where DIY costs have been in excess of 50% higher. These savings are further enhanced by licensing cost advantages for those users that need ODA's capacity-on-demand option.

Of course, ODA is simplicity itself to operate. In practice, this means deployment is possible in minutes rather than what could be hours, days, or weeks for a DIY approach, as users deal with HBAs, NICs, drivers, servers, and storage devices whilst simultaneously trying to get everything patched, up-to-date, and cooperating with one another. And in production, ODA benefits from a number of unique Oracle co-engineered efficiencies that help to drive both operational and TCO benefits beyond what organizations could usually achieve with a self-built or HCI offering.

The latest X8 model of the ODA adds both horsepower (the latest generation Intel Xeon processors[3]) and scale with both more physical networking ports and increased storage capacity.[4] As users would expect, it also supports the latest Oracle Database 19c in addition to prior versions (11*g* and higher).

In addition to the expected, but nonetheless valuable, turn of the "specification screw," Oracle continues to add new added-value software features, mainly focused on improving monitoring and management.[5] A handful of highlights are:

- Appliance Manager browser user interface (BUI), which is more modern, intuitive, and, of course, easier to use.

- Multiple bundled patching enhancements, together with a precheck and validation of the environment (via "ORAchk" integration) to ensure patching success.

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[2] ibid
[3] CPUs are the 2.3 GHz, 16 core Intel® Xeon® Gold 5218 Processors, which also offer "Spectre" and "Meltdown" mitigation in silicon.
[4] Configurations start at 192GB memory and 12.8TB NVMe flash, ranging up to 1.5TB memory and 369TB SSD or 92TB SSD / 504TB HDD (raw).
[5] Since these are software improvements, they also apply to all older and eligible ODA deployments.

- The addition of a backup and recovery tool, as well as backup automation for *both* on-premises and the cloud. Indeed, a primary use case for the ODA—and a necessary function of its deployment for smaller operations and at the edge—is easy-to-use and inexpensive HA and DR.

- An ability to make database snapshots via checkboxes on the BUI/ODACLI. This allows, for instance, space-efficient clones for dev/test.

- Flexible per-database mirroring options enable different approaches as needed for different databases.

ODA – Real Added Value and Real Simplicity

With ODA, Oracle customers can extend the availability and stability of Exadata to their edge and departmental requirements with lower costs, making it ideal for organizations that are embracing remote working environments.

The fact that Oracle is responsible for the entire hardware and software stack explains why there is so much logical and operational cohesion in the ODA. As mentioned earlier, this foundational element of the appliance approach reduces the pain that can accompany alternative DIY, CI, and HCI approaches, but Oracle takes advantage of its Engineered System approach to deliver enhanced values as well:

Removing Pain…

- Clearly, ODA is purpose-built and optimized to deliver performance and scale for Oracle Databases and applications, while reducing complexity and simplifying operations.

- Built-in best practices and Oracle support; having all hardware and software components engineered and supported by Oracle means a single point of contact for issue resolution.

- Patching: automated upgrades/system learning, etc.

…and Adding Gain

- "Zero-admin" addition of data storage: plug it in and activate it, no configuration required.

  o 48% of respondents mentioned data growth as a challenge (per the ESG research in Figure 1).

- Capacity-on-demand licensing: scale up as needed to meet performance requirements.

  o 35% of respondents mentioned meeting database performance requirements as a challenge (see Figure 1).

- Cloud and architectural equivalence to grow/move where and how you need.

  o The majority of ESG research respondents (53%) consider both on-premises and public cloud resources equally when considering how to deploy new applications,[6] so flexibility matters.

- Security is "built-in, not bolted-on." Oracle has "soup to nuts"—firmware, OS, database—integrated security specifically optimized for the database.

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[6] Source: ESG Research Report, *2020 Technology Spending Intentions Survey*, February 2020.
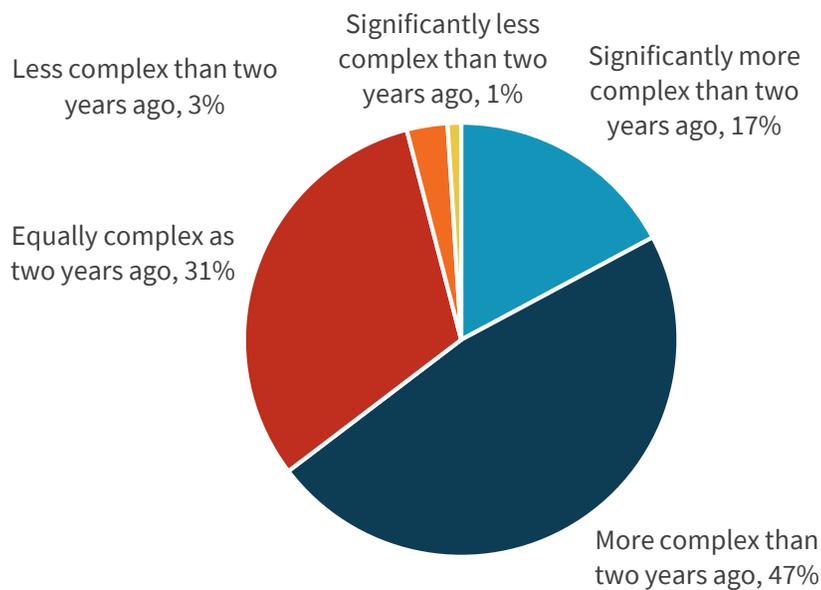
- o   When ESG research respondents were asked about the business initiatives that would drive the most technology spending in their organizations in 2020, the most popular response was strengthening cybersecurity tools and processes.[7]

- •   "Solution in a box."

- o   By default, ODA runs as a bare metal database server, but ODA also supports built-in virtualization to run both database *and* applications, which enables the creation of a simple solution in a box, ideal for deploying complete applications in/to remote locations such as branch offices, hospitals, and factories.

The Competition: 'Cumulative Simplicity' Is Not Necessarily Simple

No one wants to add unnecessary complexity to their IT operations. Yet, even with every IT vendor claiming that its products are indeed simple and/or easy to use, IT organizations are not feeling the benefit. As the ESG research in Figure 2 shows, almost two-thirds (64%) of respondents think IT is *more* complex than two years ago.[8]

Figure 2. IT Complexity Compared to Two Years Ago

**In general, how complex is your organization's IT environment relative to two years ago?
(Percent of respondents, N=658)**

Less complex than two years ago, 3%

Significantly less complex than two years ago, 1%

Significantly more complex than two years ago, 17%

Equally complex as two years ago, 31%

More complex than two years ago, 47%

Source: Enterprise Strategy Group

Part of the explanation for that lies in the burgeoning volumes of data and devices, and within that there is the challenge that "cumulative simplicity" (each standalone element can be simple in and of itself) does not inherently result in overall simplicity. It's more likely the opposite. Managing different components (however "easy" each is) just gets progressively more complex, confusing, and time consuming, with less certain results. Just try preparing a meal with the ingredients stated in a mixture of ounces, milliliters, cubic inches, cups, and pinches!

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[7] ibid.
[8] Source: ESG Research Report, *2020 Technology Spending Intentions Survey*, February 2020.

And yet that is the alternative to ODA: a mix of building block components, all theoretically simple, and no doubt all complying to standards of some sort; it is up to the user to pick what's best, integrate to make it all work, and then optimize it. An almost literal comparison to another type of building blocks (children's) gives an insight into how complex this can get, even when superficially everything seems OK. Many brands claim compatibility with Lego (the leader in this market)—examples include Duplo, Playmobil, Megablocks, Cobi, Sluben, and many more. Many are indeed fully, or mostly, physically compatible (they are "simple" to choose and use), but the potential issues are not unlike things that might be found in IT. So, for instance, the blocks might not be 100% compatible in terms of fit, finish, or color. Sometimes figures from one manufacturer will not fit the bases from another. Some brands can be perceived as "lesser" or even banned from competitions (a parallel might be recruitment and training in IT). Availability and support can vary across regions and brands, with even legal challenges; and, regarding the overall "ecosystem," some brands will have no resale value and/or not be suitable for education curricula (a Lego value proposition).

While this is an oversimplified analogy, dealing with the issues of deploying a database can be quite frustrating, whether choosing a fully DIY solution, or a converged infrastructure and/or reference architecture approach: complexity, operational limitations, support challenges, and so on. You might not get what you expected in terms of outcomes and you might only find that out when it's too late, and you are feeling the need to brush up your resume!

ODA: Contrasting with the Competition

With Oracle's massive global enterprise presence in the database world, it is not surprising that its erstwhile HCI competitors will put the Oracle logo in their sales and marketing materials myriad times. And to be sure, Oracle Database can run on these other platforms, *but it simply cannot be deployed as fast or run as smoothly or optimally as it will on ODA* (with Oracle being the sole developer and supplier of all ODA's hardware and software, it's only to be expected). Competitive solutions have limited specialist integration, and certainly don't have any special co-engineered functionality or code-level engineering with Oracle at the database or applications layer. For instance, competitive scale-out architectures can easily consume 3x the storage capacity of ODA X8 merely to try to protect against multiple node failures. In addition, the hypervisors alone can add up to 30% overhead for CPU, memory, and I/O while limiting application performance. Furthermore, scaling becomes of the "coarse grain" variety, as competitive solutions don't normally allow users to scale the various elements—storage, networking, compute, and memory—separately.

With ODA X8, the bottom line is that much more of the business-critical stack is integrated: the software is hardware-aware, the hardware is software-aware, and therefore its users benefit from cooperative co-processing of compute and storage. The ODA is purpose-built to run Oracle Database, while competitive alternatives are of necessity composed of general-purpose non-Oracle-optimized components and thus will suffer in comparison.

There are many well-known HCI/CI competitors to ODA X8 from such brands as VMware, Nutanix, Dell EMC, and HPE. One of the challenges with regular product comparisons is that they tend to lead us inevitably to look at product aspects that can easily be compared: bandwidth, capacity, that sort of thing. For ODA, a more useful approach is that of *contrasting* it to the alternatives, for its inherent integration with Oracle Database and optimized hardware allows it to deliver values that cannot be found elsewhere. For instance:

- If a user is running Oracle Database, they will be able to obtain incremental business value when running it on ODA and Exadata, via additional capabilities, such as HCC to Automatic Indexing for Exadata, that are uniquely available via Oracle's engineering of the entire database environment.

- A common approach across edge and core is obviously great news—often a prerequisite—for large companies that might well run ODA for dev/test and in edge deployments, such as branch offices, while using Exadata for production in their data center core.

- ODA also provides a direct link to Oracle Cloud Infrastructure, enabling customers to use the intuitive browser interface to back up databases to Oracle Cloud Infrastructure Object Storage, where they can be run in the Oracle Database Cloud service. As a pragmatic vendor, Oracle is of course happy to bundle these offerings and provide enhanced value to its interested customers. Other providers of HCI/CI offerings invariably don't have a cloud of their own to form such a tight linkage with, which means more DIY work, with likely security challenges and steeper learning curves for users trying to navigate across different worlds.

ODA: Power to the Edge

The growth of edge computing will likely dwarf what we have seen with the cloud so far; this is because the former expands the reach, speed, responsiveness, customization, and availability of IT, while the latter more often replaces or enhances what we had. Across multiple industries and applications, the promise of, and at, the edge is genuinely the stuff of paradigm shifting. However, its promise will only be achieved, and its value maximized, if the platforms upon which it runs are integrated and optimized across the hardware/software stack. There are specific needs around such things as integrated management and operations, simple HA and DR, built-in advanced security and reliability, flexibility in terms of performance, and scale, while longevity and dynamism can only be enhanced by having standard foundational compute platforms and an open source operating system. For edge computing needs, ODA checks (or, depending where your edge is, ticks!) all the boxes. With its simplified remote management and monitoring, an Intel + Linux underpinning to Oracle Database itself, plus proven reliability, security, and isolation between tenants and applications, ODA is a perfect tool to make the edge both manifest and successful.

The Bigger Truth

Oracle Database Appliance is now into its seventh generation. In all that time, Oracle has managed to carefully walk the line between simplicity and flexibility and retain ODA as a valuable "hyper-hyperconverged database offering." It is not only purpose-built and simple to deploy and use, but also provides added value beyond mere out-of-the-box convenience.

ODA is all-up and all-in an optimized, packaged offering to provision and run an Oracle Database environment for a small to midsize, entry-level enterprise, or edge database operation for a company of any size. While the term "no brainer" is a tad simplistic and can overlook relevant adjacent factors, there are categorically unique capabilities and user values that are available with Oracle Database Appliance. It contrasts impressively against the competition, and so, for such environments, ODA is indeed as close to an obvious choice as one is likely to come across in IT.

Moreover, ODA's capabilities are not just powerful and impressive when applied to generally existing IT needs; they also make up a perfect solution for the edge where risk simply cannot be tolerated. Yet, minimizing risk cannot be achieved by settling for lower capabilities, flexibility, performance, or security. ODA avoids any such compromise and will continue to shine in Oracle Database environments, be they simply small to midmarket organizations, departmental, distributed, or, now and increasingly, at the edge.

The bottom line? All too often, vendors feel compelled to apply sophisticated semantics and clever wordplay to "dress up" a product or claim. With ODA there is no such need, as it speaks for itself. As stated right up front in this report, Oracle Database Appliance is a complete, simple, optimized, and affordable way to run Oracle Database for small to midmarket organizations, business units, or edge operations; in such environments, there really is no easier or better way to run Oracle Database.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides market intelligence and actionable insight to the global IT community.

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